

****2D Hydrodynamic Modeling in the Yolo Bypass to Support Habitat Evaluation**

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Abstract: The Yolo Bypass is a major seasonal floodplain in the Central Valley and the Delta that provides rearing habitat and serves as a migratory pathway for juvenile Chinook salmon and splittail. In support of the Central Valley Flood Protection Plan (CVFPP) Restoration Opportunity Assessment (ROA), two-dimensional (2D) hydrodynamic modeling was performed using MIKE 21 FM to predict seasonal inundation patterns in the Yolo Bypass under a range of flows to understand habitat conditions for juvenile Chinook salmon and splittail. Prior habitat use studies in the Yolo Bypass (e.g., Sommer et. al., 2005) have shown the importance of sustained inundation in the Yolo Bypass, resulting in increased fish residence time. However, the hydrology of the Yolo Bypass is complex with inundation possible from multiple sources with varying degrees of alteration and timing. As such, the aim of this analysis is to investigate habitat evaluation criteria in the Yolo Bypass under a range of flow conditions and in years when spatial and temporal trends in juvenile Chinook salmon use were monitored. Historical hydrology for two high performing years and two low performing years for juvenile Chinook salmon and splittail were simulated and used to test and/or improve existing habitat evaluation criteria and identify differences in high and low performing years.

Fisheries enhancement in the Yolo Bypass is a key component of the BDCP with the goal to improve passage, reduce stranding, and increase floodplain rearing and spawning habitat while maintaining flood control and agricultural functions. Through better understanding of baseline conditions, this study will help inform fisheries enhancement measures.